

WHAT IS CLAIMED IS:

1. A high density inductor comprising:  
a coil having a spiral shape; and  
a core member disposed in such a way as to  
5 coincide with a path of a magnetic line of force  
generated by said coil;  
wherein said coil has a form in which a  
plurality of wire layers are piled up in a thickness  
direction, and the wire layers are formed by a thin  
10 film forming process.
2. A high density inductor according to claim 1,  
wherein a ratio of the thickness of said coil to the  
line width of said wire layers is equal to or more  
15 than 1.
3. A method for producing a high density  
inductor comprising the steps of:  
forming a coil having a spiral shape;  
20 sealing the coil in the interior of a core  
member; and  
forming a terminal electrode for allowing  
electric conduction to said coil on the outside of  
said core member;  
25 wherein said coil is formed by repeating a  
process of forming a wire layer by means of a thin  
film forming process and a process of forming an

additional wire layer on top of said wire layer by means of the thin film forming process to pile up the wire layers.

5           4. A method for producing a high density inductor comprising the steps of:

          forming a coil having a spiral shape;

          sealing the coil in the interior of a core member; and

10           forming a terminal electrode for allowing electric conduction to said coil on the outside of said core member;

          wherein said coil is formed by a process comprising the steps of forming a groove portion  
15   corresponding to the shape of the coil in a resist by photo etching, depositing a metal in the groove by plating to form a wire layer, then removing said resist, applying the resist up to a height beyond said wire layer, forming a groove portion on top of  
20   said wire layer by photo etching again, then forming an additional wire layer by depositing the metal in the groove portion by plating, and repeating piling-up of the wire layers to form the coil with a predetermined thickness.

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          5. A method for producing a high density inductor comprising the steps of:

forming a coil having a spiral shape;  
sealing the coil in the interior of a core  
member; and

forming a terminal electrode for allowing  
5 electric conduction to said coil on the outside of  
said core member;

wherein said coil is formed by a process  
comprising the steps of forming a groove portion  
corresponding to the shape of the coil in a resist by  
10 photo etching, depositing a metal in the groove by  
plating to form a wire layer, then applying the  
resist again up to a height corresponding to a next  
wire layer, forming a groove portion on top of said  
wire layer by photo etching again, then forming an  
15 additional wire layer by depositing the metal in the  
groove portion by plating, and repeating piling-up of  
the wire layers to form the coil with a predetermined  
thickness.

20 6. A method for producing a high density  
inductor according to claim 4 or 5, wherein said wire  
layers are formed by sputtering instead of plating.

7. A method for producing a high density  
25 inductor according to any one of claims 3 to 5,  
wherein said coil is sealed in said core member by  
forming said coil on a dummy substrate, inserting

said coil into said core member while maintaining said state, and then removing a part or the whole of said dummy substrate.

5           8. A method for producing a high density inductor according to any one of claims 3 to 5, wherein said coil is fixed and sealed by injecting an organic or inorganic adhesive into the interior of said core member and curing the adhesive.

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          9. A method for producing a high density inductor according to any one of claims 3 to 5, wherein an electrode lead-out portion for said coil is formed on a side surface of said coil either  
15 directly or with an insulating layer between after said coil is sealed.

          10. A method for producing a high density inductor according to any one of claims 3 to 5,  
20 wherein after said coil is sealed, a side surface of said coil is smoothed by grinding, and an electrode lead-out portion for said coil is formed on the side surface of said coil either directly or with an insulating layer between.

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